

THE TYPIFICATION OF BOMBAX, GOSSAMPINUS AND SALMALIA

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	Page
1. INTRODUCTION	173
2. THE LECTOTYPE OF <i>Bombax</i>	174
3. CONSERVATION OF <i>Bombax</i> IS UNNECESSARY	176
4. THE INTERPRETATION OF <i>Bombax</i> SENSU STRICTO	177
5. <i>Gossampinus</i> VERSUS <i>Salmalia</i>	178
6. CONCLUSIONS	180
7. APPENDIX	180

1. Introduction

In *Species Plantarum* (1753) under the generic name *Bombax*, LINNAEUS described three species: *B. Ceiba*, *B. pentandrum* and *B. religiosum*. The last two were soon transferred to two different genera, *Ceiba* and *Cochlospermum*, yielding the new combinations *Ceiba pentandra* (L) GAERTN. and *Cochlospermum religiosum* (L) ALSTON respectively. No one has disputed these transferences; consequently the genus must be typified on *B. Ceiba* L., the only original species now remaining in it.

But this view concerning the typification has been contested as illicit, and moreover it goes against the lectotype-species recommended in the Rules. Now this lectotype-species, *B. malabaricum* DC., was published in 1824, many years after the genus and its original three species; and if it is accepted as the lectotype for the genus, botanists will have to reject *Bombax* L. (1753) sensu strictissimo with *B. Ceiba* L. (1753) sensu stricto as the lectotype, and to accept *Bombax* L. (1753) sensu International Rules (1935) with *B. malabaricum* DC (1824) as the standard species. A claim has also been made that, though *Salmalia* SCHOTT et ENDLICHER (1832) and *Gossampinus* HAM. (1827) are rival names to *Bombax* L. (1753) sensu International Rules (1935), there are no such rival names for *Bombax* L. (1753) sensu strictissimo with *Bombax Ceiba* L. as the lectotype, except *Eriotheca* SCHOTT et ENDL. (1832) and *Bombacopsis* PITT. (1916), which generic names, apart from their being little used and younger than *Bombax*, cannot be considered as being absolute synonyms of *Bombax* L. sensu strictissimo. Since any change in the lectotype-species of *Bombax* affects the nomenclature of some species and genera of Malayan importance, I have enquired into the typification of the genera *Bombax*, *Gossampinus* and *Salmalia*.

The results show:—

- (1) that the typification of *Bombax* made by SCHOTT and ENDLICHER (*Metel.* 1832), and later by Dr. BAKHUIZEN (*Bull. Jard. Bot. Buitenz.* VI, 1924, pp. 161–240), is the correct one;
 - (2) that the typification recommended in the Rules cannot be accepted;
 - (3) that, unless the evidence produced below is wrong, the name *Gossampinus* cannot be maintained except as a synonym of *Ceiba*;
- and (4) that *Salmaal* SCHOTT et ENDL. (1832) is the legitimate name for *Gossampinus* HAM. sensu BAKHUIZEN (1924). The reasons for these conclusions are set forth below.

2. The Lectotype Species of *Bombax*

In the Rules of Botanical Nomenclature ed. 3 (1935 p. 139) there is incorporated a proposal which advises botanists to make *Bombax malabaricum* DC. (= *B. Ceiba* L. *partim*) as the lectotype of the genus. But as, according to resolution passed at the last Botanical Congress, Amsterdam (1935), all the lectotype-species indicated in the Rules must “be adopted by botanists unless there is clear reason for rejecting any species in favour of another,” I propose first to deal with the principal reasons which show why *B. malabaricum* DC. cannot be accepted as the lectotype for *Bombax* L. (1753). In order that the reader may follow my arguments better, I transcribe here the proposal as made originally by Miss M. L. GREEN in *Proposals by British Botanists* (1929 p. 160) to which book the Rules refer:—

“580 *Bombax* L. Sp. Pl. 511; Gen. Pl. ed. 5: 227.

“*B. malabaricum* DC. (*B. Ceiba* L. *partim*), the only element of *Bombax* L. (1753) still retained in the genus. *Bombax Ceiba* L. sensu stricto and *B. pentandrum* L. are synonyms of *Ceiba pentandra* (L.) GAERTN. and *B. religiosum* L. is *Cochlospermum Gossypium* DC.”

Now when Art. 51 says that “when a genus is divided into two or more genera, the generic name must be retained for one of them,” it has generally been taken to mean that, in typifying a genus, at least one of the original species has to be retained under it and that the name or the epithet of the species has also to be retained unless there is an intrinsic defect in the name or the epithet itself, which makes the name or its epithet either invalid, or non-legitimable. This interpretation of the Article is re-inforced by the ruling in Art. 18 which ordains that a genus must be typified on one of the original species (= constituent elements) and that the name of a taxonomic group must be changed if the type of that name is changed.

The striking novelty in Miss GREEN's proposal, therefore, is that it obliges botanists to consider, in typifying *Bombax* L. (1753), not any one of the three original species published in *Species Plantarum* (1753), but a species (*B. malabaricum* DC., 1824), published several years after the validation of the genus. The only relation of the suggested lectotype-species with the original genus is that the lectotype-species included as one of its syntypes a drawing quoted by LINNAEUS under the original species *B. Ceiba*, though the drawing is now excluded from the typification of *B. Ceiba*. If this novel procedure is admitted as licit, then it would mean that one could transfer the holotype or lectotype of one species to another and yet retain the specific name for the residual paratype or syntype which clearly did not form the basis of the species. Such a procedure, if admitted, would render Arts. 18, 51 and 52 utterly valueless or would give them only the force of recommendations.

Miss GREEN's proposal, therefore, violates the very fundamentals of the type-concept, which, together with the priority-concept, are regarded as the very essence of the new Rules as adopted at the Cambridge Congress (1930) and later confirmed at the Amsterdam Congress (1935); consequently the lectotype-species indicated in the Rules for the interpretation of the genus *Bombax* cannot be accepted.

However if great nomenclatural changes would result by typifying *Bombax* on *B. Ceiba* L. *sensu stricto*, then the changes could be prevented not by selecting a lectotype-species in violation of the very fundamental principles of the Rules, but either by selecting another one of the original species, or if, as is in this case, that is impossible, by taking advantage of the provision in Art. 21 thereby rejecting *Bombax* L. (1753) and conserving *Bombax* DC. (1824) with *B. malabaricum* DC. as the lectotype. A third alternative would be the rejection of the present typification of *B. Ceiba* L. and the typification of it in a way that would bring about the least possible disturbance in the accepted nomenclature; but in my opinion it would be a bad precedent to reject, by legislation, a long accepted typification of a species in order to interpret it anew.

It may be observed here that the case of *Bombax* is, to a certain extent, comparable with that of *Ixia* L. typified by the late Dr. A. S. HITCHCOCK (*British Proposals* 1929 p. 118). While discussing "standard-species" Dr. T. A. SPRAGUE (*Kew Bull.* 1926 pp. 96-100) had proposed that, in certain exceptional cases like that of *Ixia* L. (1753), it should be possible to transfer to another genus or other

genera all the original species, and to select, as the standard for the genus thus denuded, a species published subsequently to the genus and to the original species. But this exception, if admitted, would have violated the very fundamentals concerning the lectotype species, a notion thus enunciated by Dr. SPRAGUE:—

“Obviously the generic name should not be transferred to a genus containing none of the original species” (*op. cit.* p. 96) “Rule 1—The standard species should be one which was included in the genus when the latter was first effectively published” (*op. cit.* p. 98).

Presumably in order to preserve this principle intact in the Rules, the late Dr. HITCHCOCK did not accept *Ixia* L. *Sp. Pl.* (1753) 36 et *Gen. Pl.* (1754) as typified by Dr. SPRAGUE (*op. cit.* p. 100), and proposed (1) first the rejection of *Ixia* L. (1753–54), and then (2) the conservation of *Ixia* L. *Sp. Pl.* ed. 2 (1762) 51 with *I. polystachya* L. (1762) as the standard-species.

Both the proposal of the late Dr. HITCHCOCK and the fundamental notions enunciated about standard-species by Dr. SPRAGUE in these excerpts accord fully with the notion concerning nomenclature types in Art. 18. And the strict adherence to these fundamentals would also prevent haphazard proposals being made concerning the lectotype species.

3. Conservation of *Bombax* is unnecessary

However, the conservation of *Bombax* sensu Miss GREEN is not only unnecessary, but it will, if thus conserved, be followed by many undesirable nomenclatural changes.

Miss GREEN says that *Bombax Ceiba* L. sensu stricto and *B. pentandrum* L. are synonymous with *Ceiba pentandra* (L) GAERTN. But all the authors so far consulted by me are unanimous in maintaining that *B. Ceiba* L. sensu stricto and *Ceiba pentandra* (L) GAERTN. (= *B. pentandrum* L.) are two distinct species belonging to two different genera. [cf. DC. *Prodr.* 1824; SCHOTT et ENDL. *Metel.* 1832; ENDL. *Gen. Plant.* 1832; K. SCHUMANN in ENGL. PRANTL. *Pflanzenf.* III, 6 (1895) p. 62; *Index Kewensis*; BAKHUIZEN, *Bull. Jard. Bot. Buitenz.* VI, 1924]. Also FAWCETT and RENDLE (*Flora of Jamaica* V, 1926 p. 150) are careful to indicate that the binomial *Bombax Ceiba* cited under *Ceiba pentandra* (L) GAERTN. is not *B. Ceiba* L., thus:—

“*B. Ceiba* Lun. Hort. Jam. I, 243 (1814) (non L)”.

The two species (*B. Ceiba* L. and *B. pentandrum* L.) being different and not congeneric—none of the modern monographers having so far disputed this conclusion—there is no reason why *Bombax* L. should be rejected by legislation and *Bombax* DC should be placed among *nomina generica conservanda*. Nor is there reason to disregard the typi-

fication of *Bombax* L. (1753) by SCHOTT and ENDLICHER (1832) who reserved the name for the American element of *B. Ceiba* L. = *B. Ceiba* L. sensu stricto, and created a new generic name *Salmalia* for the Asiatic element of *B. Ceiba* L. [= *B. malabaricum* DC. (1824) = *Salmalia malabarica* (DC) SCHOTT et ENDL. (1832)].

4. The Interpretation of *Bombax sensu stricto*

As said above, the interpretation given to the genus *Bombax* L (1753) by SCHOTT and ENDLICHER (1832) and later by Dr. BAKHUIZEN (1924) is the correct one. It is also the one to be followed if botanists are to stabilize the names on any definite principles. The reasons given by Dr. BAKHUIZEN, though incomplete, are worthy of consideration. After pointing out that LINNAEUS had complicated the identity of *Bombax Ceiba* L. both by citing in its synonymy *Moul-elavou* of RHEEDE and by supposing that the species occurred both in the West and in the East Indies, Dr. BAKHUIZEN stated his case thus:—

“By this error and his poor descriptions, nobody is able to make out what he meant, but after all he actually must have had in mind an American plant. Not only in the generic descriptions (Gen. Plant. 6th ed. 1764), he speaks of “calyx persistens” and moreover calls the species after an American name, *B. Ceiba*, but in the 2nd ed. of the Spec. Plant. it appears much more clearly, that he must have in mind the American plant, for he refers to JACQUIN’s description.”

“..... The first correction has been made by SCHOTT and ENDLICHER, who restricted the generic name *Bombax* L. to the species of American origin, and gave the name *Salmalia* SCHOTT et ENDL. to the Asiatic plants. To my opinion, they were quite right; only they failed in pointing out the principal differences between these two genera.

“But the generic name *Gossampinus* HAM., which is older has priority, since *Gossampinus alba* HAM., one of the two species described under it, was removed as a synonym to *Ceiba pentandra* (L) GAERTN. so that only *Gossampinus rubra* HAM. remains in the genus.” (*Bull. Jard. Bot. Buitenz. VI*, 1924, pp. 187–188).

Apparently Dr. BAKHUIZEN had not had an opportunity of consulting LINNAEUS’s *Genera Plantarum* ed. 5 (1754); for the words “calyx persistens” also occur in that edition. Besides, if the interpretation of *Bombax* is based entirely on the generic description given in *Genera Plantarum* ed. 5 (1754), it becomes impossible to take RHEEDE’s picture of *Moul-elavou*. The name *Bombax* is followed by a sign (cross or dagger) which, according to the explanation given in the introduction of the work, means that the description was derived from a dried plant (and therefore not from a living plant or from a figure). Further from the observation following the description it appears that LINNAEUS had examined more than one kind of flower

representing more than one species. This sign is, however, omitted in the *Genera Plantarum* ed. 6 (1764), whether or not by error it is not known.

But apart from these considerations, it must be remembered that SCHOTT and ENDLICHER (1832), after removing from the genus *Bombax* L (1753) *B. pentandrum* and *B. religiosum*, and so leaving only *B. Ceiba*, were the first persons to recognize the mixed nature of this species and they typified it as the American plant by transferring the Asiatic element of LINNAEUS to *Salmalia* SCHOTT et ENDL. (1832).

In further elucidation of the principles here involved I might be allowed to transcribe here some remarks I made on the subject in *Gardens' Bulletin Straits Settlements* IX (1937) :—

“If a mixtum compositum (positive) covers two or more species or elements of a rank higher than that of species, then follow the earliest interpretation that takes into account all the *characters of greater importance* [explained in the paper], even if this interpretation does not agree with the characters of lesser importance” (p. 248).

“Where there are equally good botanical reasons in favour of more than one specimen being chosen as the Lectotype, systematists must, in the interest of stability of nomenclature, accept as the standard of the (original) species the first published choice of lectotype” (p. 296).

Fortunately in the case of *Bombax* L (1753) it appears that the lectotype agrees with the generic description of lesser importance also, so that there is no need to go to *Bombax malabaricum* DC (1824) in order to typify it.

But now, following the recommendation by Miss GREEN, if one considers *Bombax* L. sensu strictissimo as synonymous with *Gossampinus* HAM. sensu BAKHUIZEN (1924), then one will be obliged to use another name for the genus called *Bombax* by ENDLICHER and SCHOTT (1832) and accepted as such by Dr. BAKHUIZEN (1924). Further, if the distinction made by botanists between *Bombax*, *Eriotheca*, and *Bombacopsis* is admitted, then the taxonomic group called *Bombax* by SCHOTT and ENDLICHER (1832), having *B. Ceiba* L. sensu stricto for its lectotype, will be without any name; and this denudation of the Linnean genus must be carried out if the generic name *Bombax* is reserved for *B. malabaricum* DC (1824). This species, however, will presently be shown to have already a very good generic name, even when it is made the type of a special genus and defined in a very restricted sense.

5. *Gossampinus* versus *Salmalia*

Both *Index Kewensis* and Dr. BAKHUIZEN give *Gossampinus* as having been first published by HAMILTON in *Transactions of Linnean Society, London*, XV, 1827 pp.

126–128. But this is an error, for no generic name is definitely published there and HAMILTON himself refers in the *Transactions* to his previous Commentary on RUMPHIUS's *Herbarium Amboinense*, where, he says, he gave reasons "for adopting the name affixed to it in the collection presented to the India House (*Cat. No. 1526*)". In the *Transactions* he gives therefore the synonyms which belong to the species *Gossampinus alba* which was apparently the name affixed to the specimens presented to the India House.

I have not had an opportunity to consult HAMILTON's Commentary on *Herbarium Amboinense* (1826); but it seems obvious that the generic name referred to in that Commentary is *Gossampinus* (a name quoted also by RUMPHIUS in a note) with *G. alba* as the binomial combination under it. From the synonymy given under *G. alba* it is evident that the generic name as published in 1826 (if it is valid) has either to be typified by the Rumphian figure of *Eriophoros javana* or perhaps RHEEDE's figure of *Panja* or *Panjala*, or to be regarded as a mixtum compositum. In the Commentary on RHEEDE's *Hortus Malabaricus* (*Trans. Linn. Soc. London. XV, 1827, p. 128*) HAMILTON added a new binomial, *G. rubra*, which was based chiefly on *Moul-Elavou* of RHEEDE.

Now the first persons to recognize the mixed nature of *Gossampinus* (assuming it to be valid) were again SCHOTT and ENDLICHER (*Metel. Bot. 1832, p. 35*), who excluded the later species *G. rubra* HAM. from the genus in order to transfer *G. rubra* to another newly created genus *Salmalia* SCHOTT et ENDL. (*vide also ENDL., Gen. Plant. 1840, nos. 5300–5303*). Consequently *Gossampinus* as typified on *G. alba* became synonymous with *Ceiba* GAERTN. (a result which would follow also were the genus *Gossampinus* HAM. published in 1826 monotypic). This means that SCHOTT and ENDLICHER were the first to restrict correctly the use of *Gossampinus* to *G. alba* HAM., that is, the plant described by RUMPHIUS under *Eriophoros javana* and by RHEEDE under *Panja* or *Panjala*.

In the interest of the stability of nomenclature, therefore, botanists must accept this decision given by SCHOTT and ENDLICHER unless definite reasons are forthcoming to show that *G. alba* should not be taken as the holotype or lectotype of *Gossampinus* HAM. (1826). Until then *Salmalia* SCHOTT et ENDL. (1832) must be accepted as the correct name for the genus called *Gossampinus* by Dr. BAKHUIZEN and its type must be *Salmalia malabarica* (DC) SCHOTT et ENDL. (= *Bombax malabaricum* DC). According to the Rules the specific epithet in *B. heptaphyllum* HOUTT. (1774) cannot be legitimized under

Salmalia because the name was either a misapplication, or if not, a later homonym, of *B. heptaphyllum* L (1762).

The acceptance of this decision given by SCHOTT and ENDLICHER concerning *Salmalia* and *Gossampinus* will involve changes in the nomenclature of all the species listed by Dr. BAKHUIZEN under *Gossampinus*; but all these binomials were newly published in 1924, through the mistaken rejection of *Salmalia* SCHOTT et ENDL. and *S. malabarica* (DC) SCHOTT et ENDL. But if these changes really must be prevented (and they cannot be prevented by making *B. malabaricum* DC. (1824) the lectotype of the genus *Bombax* L.), then *Gossampinus* HAM. (if validly published) must be rejected and *Gossampinus* BAKH. (1924) must be conserved against *Salmalia* SCHOTT et ENDL. (1832) and for no other reason than botanical misunderstanding.

6. Conclusions

(i) The lectotype species (*Bombax malabaricum* DC) recommended in the Rules for the genus *Bombax* L (1753) is unacceptable; it violates the very fundamentals of the type-concept embodied in the Rules.

(ii) The genus must be typified on the American *Bombax Ceiba* L (1753) sensu stricto, the only species left in the genus out of the original three.

(iii) If *Bombax* L. is typified on the Asiatic *B. malabaricum* DC (1824) great nomenclatural changes will follow: the American plants now referred to *Bombax* L sensu strictissimo (with *B. Ceiba* L. sensu stricto as the lectotype) will be without a generic name.

(iv) *Gossampinus* HAM. as restricted by SCHOTT and ENDLICHER (1832) is merely *Ceiba* GAERTN. This sense must be accepted.

(v) *Gossampinus* HAM. quoad alteram partem is *Salmalia* SCHOTT et ENDL. (1832) which is the legitimate generic name having as its type *Salmalia malabarica* (DC) SCHOTT et ENDL. = *B. malabaricum* DC (1824).

7. Appendix

Unless it be to protect a use of a name current for a hundred years or more, it is inadvisable, I think, to add new names to the list of *nomina generica conservanda* of 1905-1910, without first establishing definite principles by which to appreciate the proposals for the conservation of names. The principle that transferred applications could be conserved has been accepted by botanists in general, but when one examines many rejections of generic names (e.g. *Oreodoxa*, *Conocephalus* Bl., and *Ucriana* SPRENG.) one notes that this principle is not consistently applied. Even

Dr. SPRAGUE, who otherwise strongly upholds in principle the conservation of transferred applications in order to prevent unnecessary changes (*Kew Bull.* 1926 pp. 96-100; *Brit. Prop.* 1929 pp. 47-49), rejected a proposal to conserve *Marica* in a sense used for more than 50 years previously both in revisions of that genus and in BENTH. et HOOK. f., *Gen. Plant.* (1883), ENGL. et PRANTL., *Pflanzenfam.* (1888) and DALLA TORRE et HARMS. *Gen. Siphon.* (1900), because there was an earlier *Marica* SCHREB. (1789), a superfluous name for *Cipura* AUBL. (1775) and apparently never used in that sense since *Marica* was invested with a new sense, and also because "that was an unjustifiable transference of the name of one genus to another that had been confused with it" (*Kew Bull.* 1928 pp. 278-281); and yet the last sentence in inverted commas could equally be applied to the case of *Ixia* as discussed by Dr. SPRAGUE (*Kew Bull.* 1926) or *Bombax* as discussed by Miss GREEN. Dr. SPRAGUE created a new name *Neomarica* SPRAGUE (1928) followed by fifteen new combinations under it, all of which had valid and legitimable names under *Marica*. If *Marica* HEBERT (1840) were conserved and *Marica* SCHREB. (1789) were rejected, no changes would be required in the nomenclature adopted for over three quarters of a century in revisions and many important books. The absence of a guiding principle has hitherto been a source of very erratic and disturbing proposals, one instance of which is the case of *Bombax* discussed above. *Ad hoc* decision by votes is not a satisfactory procedure in science, as it introduces an element of resentful diversity. Besides, voting on such matters may be swayed by the personalities of either the proposers and the seconders or the opposers, a thing not so easy to happen if there are some principles by which to appreciate such proposals. If the proposals for the conservation and rejection of names were put for the approval of specialists in each family or genus, the case might be different, for they would be in the position of appreciating the proposals in their correct perspective; but since that is not possible, I still believe that in such matters as the recognition of *nomina generica conservanda aut rejicienda*, "general laws are much better for the guidance of botanists than obligations to call now and then upon the Executive Committee to give its arbitrary decisions." (*Gard. Bull. Straits Settl.* IX, 1937 p. 253).

NOTE.—Since writing the above I have discovered that LINNAEUS himself was the first person to exclude RHEEDE'S *Moul-elavou* from *B. Ceiba*; see LINN., *Syst. Nat.* ed. XII (1767) 457.